

1 1. A method of query pattern matching, comprising:
2 (a) generating a list of potential ancestors and a list of potential descendants;
3 (b) sorting the list of potential ancestors and the list of potential descendants in order
4 of a first attribute in a database;
5 (c) skipping over unmatchable nodes in the list of potential descendants;
6 (d) determining whether a second attribute of a current node in the potential
7 descendant list is less than a second attribute of a current node in the potential ancestor
8 list;
9 (e) determining, based upon a result from (d), whether a first attribute of the current
10 node of the potential ancestor list is less than a first attribute of the current node of the
11 potential descendant list, a second attribute of the current node of the potential descendant
12 list is less than a second attribute of the current node of the potential ancestor list, and a
13 level number of the current node of the potential descendant list is equal to a level
14 number plus one of the current node of the potential ancestor list; and
15 (f) appending to an output join list, based upon a result from (e), a node pair
16 comprising the current node of the potential ancestor list and the current node of the
17 potential descendant list.

1 2. The method according to claim 1, wherein the first attribute corresponds to a start
2 position.

1 3. The method according to claim 1, wherein the second attribute corresponds to an end
2 position.

1 4. The method according to claim 1, further including matching the query pattern against
2 an XML database.

1 5. The method according to claim 1, further including sorting the output join list in
2 ancestor/parent order.

1 6. A method of query pattern matching, comprising:

- 2 (a) generating a list of potential ancestors and a list of potential descendants;
- 3 (b) sorting the list of potential ancestors and the list of potential descendants in order
4 of a start position attribute in a database;
- 5 (c) skipping over unmatchable nodes in the list of potential ancestors;
- 6 (d) determining whether a start position of a current node in the potential ancestor list
7 is less than a start position of a current node in the potential descendant list;
- 8 (e) determining, based upon a result from (d), whether a start position of the current
9 node of the potential ancestor list is less than a start position of the current node of the list
10 of potential descendants, an end position of the current node of the potential descendant
11 list is less than an end position of the current node of the potential ancestor list, and a
12 level number of the current node of the potential descendant list is equal to a level
13 number plus one of the current node of the potential ancestor list; and
- 14 (f) appending to an output join list, based upon a result from (e), a node pair
15 comprising the current node of the potential ancestor list and the current node of the
16 potential descendant list.

1 7. The method according to claim 6, further including matching the query pattern in an
2 XML document.

1 8. The method according to claim 6, further including sorting the output join list in
2 descendant/child order.

1 9. A method of query pattern matching, comprising:

- 2 (a) generating a list of potential ancestors and a list of potential descendants;
- 3 (b) sorting the list of potential ancestors and the list of potential descendants in order
4 of a start position attribute in a database;

5 (c) determining whether input lists are not empty and whether a stack is not empty;
6 (d) determining, based upon a result from (c), whether a start position of a current
7 node of the list of potential ancestors is greater than an end position of a node on a top of
8 the stack and a start position of a current node of the list of potential descendants is
9 greater than the end position of the node on the top of the stack;
10 (e) popping the stack for a first result from (d) and for a second result from (d)
11 determining whether the start position of the current node of the list of potential ancestors
12 is less than the start position of the current node of the list of potential descendants;
13 (f) pushing the current node of the list of potential ancestors onto the stack and
14 looking to a next node of the list of potential ancestors for a first result from (e) and
15 appending matches to an output list and looking to a next node in the list of potential
16 descendants for a second result from (e).

1 10. The method according to claim 9, further including matching a pattern in an XML
2 document.

1 11. The method according to claim 9, further including sorting output in descendant
2 order.

1 12. The method according to claim 11, further including making a single pass though the
2 list of potential ancestors.

1 13. The method according to claim 11, further including making a single pass through
2 the list of potential descendants.

1 14. The method according to claim 9, further including sorting the output list based upon
2 one or more of document ID, start position of node from the list of potential ancestors,
3 and start position of node from the list of potential descendants.

1 15. A method of query pattern matching, comprising:
2 (a) generating a list of potential ancestors and a list of potential descendants;
3 (b) sorting the list of potential ancestors and the list of potential descendants in order
4 of a start position attribute in a database;
5 (c) determining whether input lists are not empty and whether a stack is not empty;
6 (d) determining, based upon a result from (c), whether a start position of a current
7 node of the list of potential ancestors is greater than an end position of a node on a top of
8 the stack and a start position of a current node of the list of potential descendants is
9 greater than the end position of the node on the top of the stack;
10 (e) for a first result from (d) popping the stack, determining whether the stack is
11 empty and if the stack is empty merging a tuple self and inherit lists into an inherit list
12 associated with a top of the stack and if the stack is not empty output the tuple self and
13 inherit list, and for a second result from (d) determining whether the start position of the
14 current node of the list of potential ancestors is less than the start position of the current
15 node of the list of potential descendants;
16 (f) pushing the current node of the list of potential ancestors onto the stack and
17 looking to a next node of the list of potential ancestors for a first result from (e) and
18 appending matches to an output list and looking to a next node in the list of potential
19 descendants for a second result from (e).

1 16. The method according to claim 15, further including matching a pattern in an XML
2 database.

1 17. The method according to claim 15, further including making a single pass though the
2 list of potential ancestors.

1 18. The method according to claim 17, further including making a single pass through
2 the list of potential descendants.

1 19. The method according to claim 15, further including sorting the output list based
2 upon one or more of document ID, start position of node from the list of potential
3 ancestors, and start position of node from the list of potential descendants.